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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN OR RELATING TO ASPIRATING
DEVICES IN DISHWASHING MACHINES

(71) We, TRIPLEX SOCIETA PER AZIONI, of Villaggio Brolo, Solaro, Milan, Italy, an Italian Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a dishwasher and in particular to a dishwasher having a device for aspirating steam from the crockery container of a dishwasher.

During the drying phase, a large quantity of steam is known to stagnate inside the crockery container of a dishwasher because of the high temperature. In those machines provided with automatic opening, this steam invades the room during the act of opening, and hence causes a disturbance which sometimes is considerable. In other machines however, the steam remains in the crockery container and as the temperature is lowered, as happens at the end of the drying phase, it condenses and is obviously redeposited in the form of droplets on the crockery.

It consequently happens that drying is imperfect and the crockery is removed still partially wet.

Finally, in all types of dishwasher commercially available, the presence of steam in the crockery container gives rise to disadvantages which have repercussions either on the external environment or on the operation of the machine.

The main object of the present invention is obviate the disadvantage stated above by the adoption in the dishwasher of a device which eliminates the steam stagnant in the crockery container after the drying phase, so as to avoid the deposit of the condensate on the objects treated, and so obtain improved drying.

The present invention accordingly provides a dishwasher having a device for aspirating steam in the crockery container of the dishwasher at the end of the drying phase, the device being arranged to aspirate the steam

from one or more openings formed in the top part of the container and to provide at the same time cooling for at least one wall of the container in order to cause condensation and precipitation of residual steam.

In a convenient embodiment of the invention, the aspirator device comprises a tubular member for disposition vertically and having at the lower end thereof a restriction, said tubular member being surrounded by an annular chamber formed between said tubular member and a second tubular member, and provided above with a connector for connection to an opening in the container from which the steam is to be extracted and below with a taper so that it presents a reduced section a small distance below the restriction in the internal tubular member, whereby, on passage of water through the internal tubular member, a suction is created in the chamber because of the restriction, which causes aspiration through the connector, the water being arranged to enter through an appropriate duct into the dishwasher and to skim the wall of the container, thereby cooling the wall and causing condensation and precipitation of any steam coming into contact therewith.

Some special arrangements may be provided both in the aspiration tube for the steam and in the discharge line from which the water discharges against the wall of the container in order to improve operation of the device.

The invention will now be described in greater detail with reference to one embodiment given by way of example and illustrated in the accompanying drawing. In the drawing, the single figure is a vertical section through part of a dishwasher embodying the invention.

The accompanying drawing shows part of a dishwasher and in particular the closed crockery container A thereof, and a device B for aspirating the steam from said container.

The crockery container A comprises in its

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laminar wall 1 an opening or hole 2 provided in a relatively upper zone, through which the tubular connector 3 of the device B is introduced, which acts as the aspiration tube for the gas or steam to be evacuated.

The device B in the embodiment shown, consists of a tubular member 4 disposed vertically, and comprising a threaded radial enlargement 4a, with a diameter considerably greater than the remaining tubular part. On this enlargement 4a is screwed another tubular member 5 comprising said horizontal connector 3, which is housed in the hole 2 in the wall 1. Said connector, which is relatively short, is provided with a thread for coupling it to a nut 6 located internally of the wall 1, whereby the device is secured to the dishwasher.

The internal tubular member 4 comprises at its internal lower extremity an enlargement 4b containing a port 7' of considerably smaller diameter than the duct 7. The external member 5 correspondingly reduces downwardly in diameter so as to give rise to a part 5a of diameter equal to that of the member 4, including the terminal part of the internal member with an interior duct 9.

In this manner a chamber 8 of annular section is formed between the two tubular members 4 and 5. The chamber is closed in an airtight manner above by the coupling between the enlargement 4a and the member 5, and communicates laterally with the connector 3 connected to the inside of the crockery container, with the restricted port 7' at the lower extremity of the member 4, and with the duct 9 the part 5a, the duct being co-axial with the duct 7 of the member 4.

Downstream of the part 5a, an elbow 10 or a like curved member is provided, which communicates the duct 9 to the inside of the dishwasher, beyond the wall 1, to which the elbow 10 is fixed by a nut 11 in a like manner to the connector 3.

In order to cause motion of the air and steam during the aspiration phase, a diaphragm 12 is provided for the connector 3 internally, which obstructs direct entrance, permitting entrance only through an opening 13 provided at a lower level and of very small section. In this manner, during the aspiration phase caused by the device B, the velocity of the gas and steam leaving the container is increased, so favouring their mixing and contact with the walls, particularly with the wall 1 which, as will be described, is cooled.

Similarly, a diaphragm 14 is provided at the outlet of the member 10 in the dishwasher the purpose of which is to reduce the exit port 15 to a very long and narrow section, so as to distribute the water in a laminar way and oblige it to skim the greatest possible surface area of the wall 1. The water

thus effects cooling of the wall, condensing part of the steam in contact with it and hence eliminating it by precipitation on the wall itself. This complementary action of the water makes the described aspiration device the best means for eliminating the steam inside the dishwasher.

The operation of the device will be clear. The tubular member 4 is connected by means of a cock (not shown) to a pipe containing water coming either directly from the mains supply or from the dishwasher recovery system as will be described hereinafter. The water on arriving at the restricted section 7' considerably increases its velocity, so creating a drop in pressure—proportional to the variation of velocity—in the chamber 8. Consequently the air and steam current is induced through the connector 3, by way of the port 13, because of the pressure difference.

The water is carried by the elbow member 10 into the inside of the dishwasher, and after having skimmed the wall 1 as described, so cooling it, it is collected in the sump, conventionally provided in the dishwasher. The water may be recovered and returned by means of a suitable pump (not shown), which may already be installed in the dishwasher, in order to feed the device through the head of the member 4.

WHAT WE CLAIM IS:—

1. A dishwasher having a device for aspirating steam in the crockery container of the dishwasher at the end of the drying phase, the device being arranged to aspirate the steam from one or more openings formed in the top part of the container and to provide at the same time cooling for at least one wall of the container in order to cause condensation and precipitation of residual steam.

2. A dishwasher as claimed in claim 1 comprising a tubular member for disposition vertically and having at the lower end thereof a restriction, said tubular member being surrounded by an annular chamber formed between said tubular member and a second tubular member, and provided above with a connector connected to an opening in the container from which the steam is to be extracted and below with a taper so that it presents a reduced section a small distance below the restriction in the internal tubular member, whereby, on passage of water through the internal tubular member, suction is created in the chamber because of the restriction, which causes aspiration through the connector, the water being arranged to enter through an appropriate duct into the dishwasher and to skim the wall of the container, thereby cooling the wall and causing condensation and precipitation of any steam coming into contact therewith.

3. A dishwasher as claimed in claim 2 in

5 which the connector connecting the chamber of the device to the crockery container has its opening closed by a diaphragm which limits the section through which aspiration takes place, so as to increase the velocity and hence the turbulence of gas and steam during aspiration phase.

10 4. A dishwasher as claimed in claim 2 or 3 in which the duct of the device has its outlet obstructed by a diaphragm device disposed at a very short distance from the wall of the container, in such a manner as to oblige the water passing from the outlet to

be distributed with laminar flow and to skim and hence cool a large part of the wall.

15 5. A dishwasher having a device for aspirating steam existing in the crockery container of the dishwasher, substantially as herein described and illustrated in the accompanying drawing.

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